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The prebiotic potential of brewers' spent grain on livestock's health: a review

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Abstract

The increasing interest from the feed as a source of energy towards specific nutrient-yielding compounds in feeds is amongst the latest developments from scientific and industrial communities. Apart from brewers' spent grain (BSG) being relatively inexpensive feed source, nutritious with high crude protein and minerals, recent studies have explored its potential as a source of prebiotics. Prebiotics are certain feeds that are comprised of non-digestive polysaccharides that can be fed to animals and modulate the balance and activities of microbial populations in the gut. The BSG contains arabinoxylans and β -glucans whereby when consumed by animals, they promote the activity of beneficial bacteria particularly species from three genera of Bifidobacterium, Enterococcus, and Lactobacillus. The increased degradation of fibrous feed accelerates the production of short-chain fatty acids (SCFA) which serve as the primary energy sources for the anaerobic microbes. This elevated concentration of SCFA stimulates numerous physio-biological functions which include intestinal nutrients absorption, glucose balance, improvement of immunity, lipid metabolism, and suppression of pathogens such as Salmonella and Escherichia coli. To capitalize on the prebiotic potential of BSG, certain considerations need to be well taken care of and these include possible microbial dysfunctions such as rumen acidosis, different responses rates of animals due to variations in health status, age, and species as well as feed safety issues especially mycotoxin contamination which can jeopardize its inherited prebiotic benefits.

Keywords

Animal health; Arabinoxylans; Brewers' spent grain (BSG); gastrointestinal tract (GIT); Non-digestible oligosaccharides; Prebiotics; Rumen microbiota; Short-chain fatty acids (SCFAs)